TECHNOLOGY DIVISION
De 2 '24 B
INDEXED

THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

ISSUED BY
SCIENCE SERVICE
B and 21st Streets
WASHINGTON, D. C.

EDWIN E. SLOSSON, Director
WATSON DAVIS, Managing Editor

SUBSCRIPTION: $5 A YEAR, POSTPAID

The News-Letter, which is intended for personal, school or club use, is based on Science Service's Daily Science News Bulletin to subscribing newspapers. For this reason, publication of any portion of the News-Letter is strictly prohibited without express permission.

Vol. V. No. 190 Saturday, November 29, 1924

OA

STAR'S LIFE LASTS 30,000,000,000,000 YEARS

Thirty trillions of years. Such is the lifetime of a star from its brilliant and gigantic babyhood to faint old age.

This latest computation of the time necessary for the complete evolution and life of a typical star in the heavens has just been reported to the National Academy of Sciences in a communication from Edward Condon, assistant to Prof. A. O. Leuschner of the University of California.

The earth is only a few billions of years old, geologists tell us after a study of radiactive rocks. The human race evolved in the course of a few hundreds of thousands of years. The greatest span of one person's life is little more than a hundred years. Yet such intervals of time are mere flashes in the life of a star.

Einstein, conjurer of time, space, and matter, gave the clue to the secret of stellar age. His idea that mass and energy can be converted one into the other led to the explanation of how a star can exist for great periods of time: throwing off great amounts of energy, and yet continue to shine apparently unchanged in brilliance.

Stars live on their fat, as it were. They gradually convert their mass into energy which they radiate away in the form of light. Young stars are giants, more brilliant and massive than fainter dwarf stars which have had their fling at life. Astronomers believe that the different kinds of stars in the heavens represent different periods or ages through which all stars pass.

Using this assumption, Mr. Condon arrived at 30,000,000,000,000 years as a rough estimate of a star's life.

This gigantic figure will comfort those which have been worried about the constancy and reliability of the earth's power plant, the sun. For the sun is a star; not a large one and it is growing smaller constantly. Four million tons of energy are given off from the sun in the form of light every second.

Yet the new figures on the age of stars indicate that the sun has been shining for billions of years in the past and will continue to shine for billions of years in the future without any great change in brilliance.

THE GEOMETRY OF ETHICS

By Dr. Edwin E. Slosson

You may, if your arithmetic is erratic, add up a column of figures a dozen times and get different sums. Only one is correct. It is necessarily the same about the more complicated problems of life, only we cannot see it so clearly. Elementary mathematics is the only science man has mastered so he can put real confidence in the results of his ratiocination.

Science, which aims at certainty, approaches it by the method of trial and error, thousand of trials, thousands of errors, before and approximation to the truth is attained. Truth is one; falsehoods are infinite.

Nine-tenths of the ideas that come into our heads are wrong. The object of education is to select the one that is right.

Nine-tenths of the impulses that beset us are wrong. The task of civilization is to suppress the nine.

No matter how complex the problem, there is never more than one right answer, one right way out, one straight and narrow path, hard to find, and hard to follow, one road leading out of the maze of many flase turns; all the others are blind alleys or paths that return upon themselves.

It is an axiom of plane geometry that there can be only one straight line connecting two points. From the point where we are to the point where we wish to go, there is only one stort straight road, all the other possible paths are more or less divergent and devious.

The rules of conduct are as invariable and absolute as the rules of geometry. The only difference is that we cannot see so clearly in ethics as in mathematics. The falling of a fog makes our road obscure but does not alter its length or direction.

There is only one best move in a game of chess, whether we know what it is or not, There is only one wisest action in any emergency, whether we know what it is or not.

There are no indifferent actions, no equivalent choices. It may seem a matter of indifference which street you turn down in your morning stroll, but that is because you do not know what fate awaits you around the corner. If you turn down First Street you may be run over by an automobile. If you turn down Second Street you may meet a man who will make your fortune. If you turn down Third Street you may catch a fatal microbe. If you turn down Fourth Street you may see the girl you want to marry.

If you knew, you could choose. But all the streets look equally inviting and not knowing which is the best you leave it to "chance". You toss up a penny, but it is not a matter of chance which face of the penny falls uppermost for that is determined by the inevitable interaction of the forces of gravitation and rotary momentum.

Even if you could know what lay before you on each of the optional avenues, you would not necessarily be able to select the best. It may be that Second or Fourth Streets would lead you to more unhappiness than First or Third. Not knowing

which is the most fortunate road you would be grateful if on that morning you should find all the others blocked by signs of "Street closed. Detour". You would be glad to be forced into good fortune if you could not find your own way. Nobody wants freedom of choice exdept in those cases where choice would lead him toward his goal, whatever that may be.

Nobody has a right to do wrong. Nobody but a congentital idiot would claim such a right and nobody but an incorrigible criminal would want to exercise it.

Every sane man wants to do what is for his best interests and every good man wants to do what is for the best interests of others as well.

There can be no two opinions about this. The only thing we disagree about is as to what is for the best interests of ourselves and society. This is due solely to our ignorance for if we all knew always what was best to do, we should of course all want to do it. But because we don't and can't always know, we have to allow considerable latitude as to thought and action, the more latitude in those fields where there is the more uncertainty. There is obviously but one course that ought to be pursued or would be pursued if we could know in advance the outcome of all our options.

STORKS, BLIVVERS OF AIR, MAKE LONG FLIGHTS

Though a slow flier the sork of European housetops is a patient one, and makes long journeys, according to Frederick C. Lincoln of Washington, who addressed the American Ornithologists' Union. The normal summer home of the European white stork is in Holland and north Germany; its winter quarters are in South Africa for the most part, although many of them remain in the lower Nile valley as well.

Birds bearing northern European identification bands on their legs have been reported in one or two isolated instances from Central Africa. This has led some bird students to believe that they cross the Sahara desert in a non-stop flight, or rest only in the oases; but Mr. Lincoln is inclined to discount this theory and to hold that these scattered cases represent wanderers from the regular route down the eastern side of the dark continent.

Storks, Mr. Lincoln said, are apparently the "flivvers" among birds, averaging only about thirty-five miles a day, a distance that a blue-winged teal covers in forty minutes.

STUDY GAME BIRDS OF ALASKAN TUNDRAS

The work of a scientific expedition that crossed Alaska to study birds on the shores of the Arctic Ocean was recently related by Herbert W. Brandt of Cleveland to the American Ornithologists' Union at Pittsburgh.

The party went from Seward, their port of entry into Alaska, to Fairbanks by rail, and then struck out overland by dog sledge to Hooper Bay. They traveled 850 miles in forty days, twenty of which were very stormy, and encountered temperatures as severe as 30 degrees below zero. Hooper Bay, their base for the study of water birds, can be reached by boat only during July and August.

[illegible]

[illegible] wrong. [illegible]

[illegible] to do what is for his best interests and [illegible] to do that is for the best interests of others as well.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] about thirty-five miles a day, a distance that [illegible]

[illegible]

The work of a scientific expedition [illegible] of the Arctic Ocean was recently [illegible] ornithologist [illegible]

[illegible] could be reached by boat only during July and August.

The principal object of the expedition was the study of migratory water birds on their summer pastures. Many of these species are important game and economic species whose habits are of considerable practical interest. However, some observations were made on the few species of birds that live in the interior, during the long sledge journey. Perhaps the most interesting of these is the Alaskan bluejay, which lays and hatches its eggs during March, when the mercury frequently drops to 40 or 50 degrees below zero.

The country along the seashore consists largely of low sand dunes and tundra where the birds are literally countless. Why they go so far north is no mystery, for during the crowded days of the short Arctic summer the tundra is spread with food like a table. Mr. Brandt stated that birds feeding on these northern plains pick up seed, berries and insects just as rapidly as hens in a prosperous farm-yard pick up grains at feeding time; and that all the birds he killed for food or specimens were heavy and fat.

The tundra also supports a large population of small animals allied to the field mice, which supply provender for snowy owls and other flesh-eating birds.

The expedition enlisted the services of the primitive Eskimos of the region. Part of them located the nests of desired species, and showed themselves to be patient and skilled searchers, finding nests that eluded even the eyes of the scientists. Others were taught to blow eggs and to prepare bird skins. In this latter work the girls were especially successful, for they have had much practice in making birdskin garments for themselves.

Among the most abundant of the birds of the region is the eider duck. Flocks averaging over a thousand specimens flew over, twelve or fifteen of them in succession. Ducks of other species, four kinds of geese, and numerous wading birds, also abounded.

One of the most difficult of the birds, from a collector's standpoint, was the snowy owl. It lays from nine to a dozen eggs, but begins sitting from the first. Consequently when the collector undertakes to blow a nest of eggs, he finds them in all conditions, from quite fresh to nearly ready to hatch. Mr. Brandt added that he did not undertake the preparation of more owls' eggs than were really needed.

CANADIANS TO EXPLORE BAFFIN LAND INTERIOR

The vast expanse of Baffin Land, north of Labrador, 200,000 square miles of icy desolation, is about to yield its secrets. The Canadian government steamer "Artic" has landed a party of engineers in command of J. D.Soper with the object of making a complete survey of the mineral resources of this practically unknown interior. They will remain eighteen months.

F. D. Henderson of the Canadian Department of the Interior, who has returned after leaving the party, says there are indications that vast amounts of coal, iron and possibly other valuable minerals will be found.

The rainfall of the south and middle west consists of water from the Gulf of Mexico.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

HUMBLE "COOTIES" HELP SOLVE ANCIENT INDIAN RACE RIDDLES

Lice, although unpleasant subjects, have scientific value as well as intensel practical interest. Therefore Dr. H. E. Ewing, specialist in such creeping things for the U. S. Bureau of Entomology, has made a study of them.

He has found that as races mingle the vermin that plague them mingle also, and hybridize. Any ex-soldier can tell of the too great intimacy of the frontline trenches and how the Russian body-louse reached the American dough-boy via the German and French armies.

But Dr. Ewing is more interested in the fundamental race problems presented by the head-plaguing vermin, or "graybacks". He finds that in America today the head lice of Caucasian, Indian and Negro are all merged in a conglomerate hybrid breed; there seems to be no color line in this unsavory universe of the unwashed.

To find records of graybacks in the pride of their ancient racial purity he has had to turn to the past. The heads of mummies supplied him with material. A few Egyptian lice were turned up; but the best crops were yielded by mummies from ancient Peru and from the old Indian dwellings of our own Southwest. And the inhabitants of the hair of these oldest inhabitants, before the present palmy days of racial melting-pots, were quite distinct. There was a Peruvian type of head louse, a Southwest Indian head louse, a head louse peculiar to the white men of Egypt. And the ancient American vermin are quite distinct from modern Asiatic types captured from the Chinese and Japanese.

Another interesting result of Dr. Ewing's studies seems to indicate that the long-tailed monkeys of the American tropics owe us humans a grudge, for the vermin that afflicts them apparently were passed on to them by man. We may boast - or try to conceal - a simian ancestry, but it seems that the thing the simian scratches for traveled the other way.

SIR OLIVER LODGE HOLDS RAIN MAKING POSSIBLE

Speaking before the London Institute of Physics, Sir Oliver Lodge gave it as his considered opinion that now that we had learnt that the precipitation of moisture depends on electrical conditions, this should give us a hint as to how to bring about rainfall, though, as he said, we still supplicate higher powers for the production or the limitation of rain instead of setting to work to see what we can do for ourselves.

The greater part of the world suffers from droughts, and if there are no clouds or extremely little moisture in the atmosphere, the case is hopless. In the countries suffering from drought, however, clouds do at times accumulate, but disappear without precipitation. Why should they not be electrified, or the sign of thei electrification be changed so that the drops should be of different potential and be likely to run together and coalesce? "Is the atmosphere," Sir Oliver Lodge said, "to be the one region of the earth over which man has no power? I do not believe that it is. The problem strikes me as no more difficult than the problem of disease at one time appeared and I venture to regard the future with hope."

In the same lecture, speaking of the possible break up of the atom, Sir Olive expressed doubt as to whether our grandchildren would live to see the utilization of atomic energy on anything like an engineering scale.

EARTHQUAKE EXPERTS CALL FOR VOLUNTEER OBSERVERS

Wanted, earthquake observers! Because of a prejudice against any earthquake publicity, no adequate record has been kept of the shocks during the past few decades. With the passing of the feeling that an earthquake is a disgrace the Seismological Society of Americais asking for help in reporting the shocks.

Where were you when the floor suddently rolled under you? Did you hear any peculiar roar like that of distant cannonading? Were you awakened from your sleep suddenly with a feeling of shock? Did another shock occur while you were awake?

These are the type of question that is asked the volunteer earthquake observer by the questionaire put out by the society. They want a report of every shock in or near the vicinity of the observer.

The study of earthquakes in the west has been organized and initiated by the Carnegie Institution of Washington, the U. S. Coast and Geodetic Survey, the U. S. Bureau of Standards, the Hydrographic Office of the U. S. Navy, the University of California, Leland Stanford University, the California Institute of Technology, and the Seismological Society of America.

NEW TYPEWRITER HAS 7,026 CHARACTERS

Japanese typewriters that have only one key but print 7,026 characters have been installed in northwest Japanese wholesale and commission houses. The machine makes carbons, prints from the bottom of the page and from left to right.

The typing characters are single bits of steel adjusted in a movable tray so as to be pushed into contact with a ribbon above to the paper placed in readiness for the writing.

The Japanese operator, generally a man, often writes at the rate of sixty wo a minute. This is twice as fast as he can write by hand. A directory like a city street guide, helps him find an unusual character. It indicates, under the word desired, a description of the row in which the character occurs, andhow many letters up from the bottom or down from the top.

In addition to the Japanese characters the English alphabet is tucked away in one corner.

WORKING PLANTS LONGER HOURS BY ELECTRIC LIGHT

That electric light may be used in place of sunlight and that it does not pay to use it are two of the first lessons taught by the experiments being carried on at the Boyce Thomspon Institute for Plant Research recently established in Yonkers, New York. The new laboratories give the experimenter for the first time opportunity to change one by one all the various factors affecting plant growth in the open, for in the enclosed underground rooms the temperature, humidity and composition of the air can be varied at will and so also can the amount, intensity, duration and character of the light.

In the experiments on the optimun length of illumination a variety of plants

were exposed to electric light for periods of 5, 7, 9, 17, 19, and 24 hours. The dark periods were secured by wheeling the carts bearing the plants into a constant dark room having the same conditions as the light room. Remarkable differences appeared in the rate of growth of the plants and the age and stature of the plants at the time of flowering with the differentlengths of day.

Varieties of tomato, snapdragon, sunflower, coleus, radish, lettuce, clover, geranium, and chrysanthemum bloom much earlier in constant light than in shorter daily illumination. Buckwheat, aster, and soy beans bloom much later in constant light than in shorter days. Salvia, cosmos, and four o'clock failed to bloom at all in constant light.

Tomato grew faster and made better plants as the daily illumination increased from five to seventeen hours. Nineteen hours daily illumination was injurious to the tomato and constant illumination finally killed it. Some other plants were injured by nineteen hours illumination and constant illumination. With some plants then there seems to be a limit to the possibility of forcing by lengthening the day. It is not known whether this is due to the need of daily rest from growing activity, or to some other cause.

But the complete replacement of natural by artificial light shows no prospect of being profitable, according to Dr. William Crocker, director of the Institute, who gives out the following figures as to the costs of illuminating the constant condition room:-

> "On the matter of the economic possibility of using artificial light for growing plants I will mention the costs of illuminating our constant condition light room. This room is eleven feet by eleven feet and is illuminated by twenty-four 1,000 watt tungsten lights. They give about 500 foot candles in the growing room after the rays have passed through the water screen to remove heat. Sunlight at noonday in June gives 4,000 to 10,000 foot candles. With the current at 4½¢ per kilowatt hour the cost of lighting this room is \$1.12½ per hour; \$27.00 per day; or \$2,430 for 90 days. It is evident that one would have to grow something of the order of value of pearls to make the use of this house commercially profitable. The reasons for this are clear. The tungsten lamps convert only seven per cent. of the electrical current used by them into light. The sun is much more efficient as a light source. Thirty-seven per cent. of the energy value of the sun's rays reaching the earth are light rays. The plant uses only the energy of the light rays for making its foods and probably the average plant in this room stores mo more than 10 per cent. of the light energy falling upon it in the form of carbohydrates and other organic foods. This means that less than one per cent. of the energy paid for as electrical current is recovered by the plant. Even a portion of this is used by the plant in its own respiration.
>
> The plant is a very inefficient mahine for the transformation and storage of energy. The only reason man can afford to use it at all is because the sunlight from which it stores the energy in nature, like salvation, is free. It might be added, however, that in spite of this inefficiency man cannot only afford but must use it for up to date the plant alone can synthesize many organic materials necessary to life.
>
> Now what is the excuse for experimenting with the growth of plants under artificial light, if the plant is such an inefficient

> machine for the conversion and storage of energy? The institute has a very good excuse. It is trying to establish the laws of plant development. The only way to establish such laws is by growing plants under controlled conditions. Artificial light makes accurate control possible. I would not imply that artificial illumination has no possibility of profitable use in the growth of plants commercially. I do mean to imply that with the present inefficiency of tungsten lights and the present price of electrical current, we cannot afford to grow the bulk of the plant (and bulk is a measure of the amount of energy stored) with artificial light even if the plant could be sold at a fancy price."

In the meeting of the Illuminating Engineers Society held at the Institute, Victor A. Tiedjens reported the results of his work on stimulating the growth of lettuce by electric light of varying intensity. A pair of lamps, ranging from 50 to 300 watts, was suspended about five feet over each plot of eight feet square and turned on for various periods after sunset. In general, it was found that the rate of growth increased with the intensity of the illumination.

> "The length of the growing period, from seedling to head formation and seed production, was shortened by two and four weeks respectively for the higher intensities, but the growth was not always beneficial to good head formation. The seed stalk was started before a good marketable head was formed in the varieties commonly grown by market gardeners."

FERMENTED BLOOD STIMULATES GROWTH

A form of artificial aliment having a power of accelerating growth in a way that reminds one of Wells's "boom-food", has been reported to the French Society of Public Medicine and Sanitary Engineering by Dr. A. Gauducheau. He makes use of waste blood from the packing houses. This is acidified with vinegar and sugar is added. Then the mixture is sown with distillery yeast and set to ferment at the most favorable temperature. The yeast cells multiply with extra-ordinary rapidity: the culture becomes covered with a thick foam and exudes an agreeable aroma. The fermentation results in two products, one a wine of appetizing flavor, and the other a first class nutriment. Since no heat is used in the process, such sensitive and unstable substances as proteins, diastases and vitamines, are retained unchanged.

Feeding young rats on a ration that contains five per cent. of this fermented product, it is found that they grow two or three times as fast as those fed on ordinary food.

But there is another side to the shield. Dr. Gauducheau finds that his new-fangled food also stimulates the proliferation of the anarchic cancer cells as well as the nomal cells of the body, so if the rats have cancer the disease will be increased.

At the session of the Society of Public Medicine at which this paper was read, Dr. Cavaillon called attention to the resemblance between the new food and that which H. G. Wells tells about in his romance "The Food of the Gods" which causes the growth of giants among rats and the human race.

Vo

wh
ju
Co
ce

ac

of
fi
wh
wi
je

ca

be
er
ne

ar
cl
Re
Th
pr
ar
th
ou
sh

Th
th
Sh
el
lo

INDUSTRIES, NOT FIREWORKS TO BLAME FOR EYE ACCIDENTS

Fourth of July accidents are responsible for 200 of the 4,456 accidents in which the eyesight of men, women, and children has been destroyed or seriously injured during the past year is the report of the investigation made by the National Committee for the prevention of Blindness. Industrial accidents account for 85 per cent. of the victims.

Twenty-five per cent. of the toal are children who become blind through play accidents and automobile accidents.

BRITISH PORT BIDS FOR INCREASED TRAFFIC

Thirteen million pounds have been set aside by the Southern Railway company of England to extend new works at Southhampton in order to attract increased traffic to the port. Work will begin at the end of the year on the reclamation project when two large jetties, 1,000 feet long, will be begun. It is estimated that it will take five years to complete the work which will provide for five 1,000 foot jetties with sites reserved for additional ones.

SKIN COLOR AND SIZE INHERITED TOGETHER

Given a big, clear skinned tomato and a small, yellow skinned tomato, how can you get a small, clear skinned tomato?

This problem is bothering research specialists at the University of Iowa because they have found a strong tendency for skin color and size to travel together. This represents one of the most frequent stumbling blocks in the production of new varieties.

Suppose that a big, clear skinned tomato and a small yellow skinned tomato are used as parents. Among the grandchildren of this pair there will be big, clear skinned tomatoes and small, yellow skinned ones, resembling the grandparents. Real small clear skinned individuals would be very infrequent or entirely missing. The combinations of size and color present in the original grandparents are still present in the grandchildren. This is what the scientists call linkage. Novelties are possible because of the ease, so frequently encountered, with which the traits that compose plants or animals are separated from one another, shuffled up and dealt out in new combinations in the course of reproduction. Linkage balks this easy shuffling up of characters.

FRENCH ARMY PLANE FITTED WITH ELEVATOR

An airplane fitted with an elevator is being constructed for the French army. This will be used by the gunner in charge of two batteries of machine guns, one at the top and the other at the bottom of the fuselage. The machine is a giant bomber. Should an attack come from above the gunner simply lifts himself by means of the elevator and gets in position to man the top guns. When an attack comes from below he can lower himself the same way.

UNIQUE BIRDS OF CHILE DESCRIBED BY NEW YORK SCIENTIST

Remarkable birds of the Pacific coast of South America, including a wild duck that cannot fly, a penguin that makes its nest in the midst of a jungle instead of on a rocky islet where one would expect to find penguins, and gulls that are a menace to sheep, were recently told about before the American Ornithologists' Union by Dr. Frank M. Chapman of the American Museum. Dr. Chapman has recently returned from a rapid study tour of the waters and coast lands of western South America.

The coast of Chile, he said, is especially well adapted for the study of bird life and other natural history problems. In the first place, the climate ranges all the way from very wet in southern Chile to obsolute rainlessness in the nitrate deserts of the north. Then, the sea penetrates deep into the Andes range, and indeed in the southern part actually pierces it in several places, so that products of southern Patagonia can be loaded on ships from the Pacific. These long fjords, as well as Magellan strait itself, are simply flooded mountian valleys, and the offshore islands are simply isolated peaks and ranges.

In this region, where Darwin spent more than a year when he was on his famous voyage in the "Beagle", a longer series of studies is planned for the near future.

Among the most interesing of the birds studied and photographed by Dr. Chapman was the loggerhead duck, also called the steamer duck, because of its peculiar method of half swimming and half flying. Its body is much too heavy for its short wings, often weighing ten or twelve pounds, and when it beats the air with its wings it rises partly out of the water, like a hydroplane, and thrashes up so much spray that it suggests the action of a sidewheel steamer, whence its name, "steamer duck".

The Chilean penguin is closely related to the penguins of the antarctic region but instead of living on rocky islands in great rookeries near the shore, builds its nest in almost impenetrable jungles on forested islands. And though the forests are of a semi-temperate zone type, they harbor such birds as parrots and hummingbird, most unlikely companions for penguins. It was like finding polar bears and elephants together, said Dr. Chapman.

The sheep ranchers of Patogonia are much distrubed over two birds, the speaker continued. One of these is the kelp goose, a large and very beautiful bird, and much devoted to his family. Bu the goose eats a great deal of grass - six geese as much as one sheep, the ranchers say - and hence is regarded as an enemy. The second bird that is "in bad" with the sheep men is the black-and-white Dominican gull. These birds have thriven marvellously on the offal of packing plants of the region and have become very numerous. But the sheep raisers claim that when their usual bounty of offal runs low the gulls attack and devour young lambs. So geese and gulls are both under the ban in Patogonia.

TABLOID BOOK REVIEW

IMMUNITY IN NATURAL INFECTIOUS DISEASES: By F. d'Herelle. Translated by George H. Smith. Baltimore: Williams and Wilkins Co. 1924. 400 pages. $5.00

This translation of d'Herelle's book in which he enlarged upon his revolutionary theory of "contagious health" will be welcomed by bacteriologistsand physiologists, regardless of the stand they take upon the bacteriophage concept. Of course the book does much more than presentthis one specific idea; d'Herelle goes exhaustively into the physiology of immunology and the theory of specific reactions of living matter generally. ----------